MARQUETTE ORE DOCK NO. 6: ORE DOCK
Lower Harbor
Marquette
Marquette County
Michigan

HAER No. MI-45-C

HAER
MICH
52-MARQ,
1C-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING SURVEY
Mid-Atlantic Region
National Park Service
Department of the Interior
Philadelphia, Pennsylvania 19106

HAER
MICH
52-MARQ,
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HISTORIC AMERICAN ENGINEERING RECORD

MARQUETTE ORE DOCK NO. 6:
ORE DOCK HAER No. MI-45-C

Location: On pilings in the city of Marquette's Lower Harbor on Lake Superior, Marquette County, Michigan.

UTM 16.470120.5154000
Quad: Marquette, MI

Engineer: Merritt-Chapman & Whitney Corporation, Duluth, Minnesota.

Date of Construction: 1931-1932.

Present Owner: Wisconsin Central, Ltd.
One O'Hare Center
6250 North River Road, Suite 9000
Rosemont, Illinois 60018

Present Use: Vacant.

Significance: The mammoth concrete and steel Ore Dock which dominates Marquette's Lower Harbor is an excellent example of the final phase in the evolution of the iron ore pocket dock in American industry. The dock is a fine example of mid-20th century industrial engineering and efficient construction. This structure dominates the harbor area and is a monument to the past commercial history of Marquette harbor.

Project Information: This documentation was undertaken from June through August 1990 in accordance with agreements with Wisconsin Central, Ltd., the Interstate Commerce Commission, the National Park Service, and the Michigan State Bureau of History.

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The concrete dock which dominates Marquette's Lower Harbor rests on thousands of pilings. It is connected to the shore by the approach trestle and a wooden walkway.

Actual work on the site began on 7 April 1931 when the contractor from Merritt-Chapman & Whitney arrived and started arrangements for construction. Two days later Gwin A. Whitney, president of Merritt-Chapman & Whitney announced that construction had begun on the site of the ore dock itself. The first men were hired and began constructing the office while preparations were made to accept the pilings which would arrive within a few days. Some 7,000 pilings would be used for the foundation and crews began to remove them from the dismantled Soo Line dock in Superior, Wisconsin on 8 April. These pilings ran 50 to 70 feet in length and there was more than enough of them at the Superior site for the new dock.

The first phase of construction was the installation of the foundation pilings. On 12 April, J.G. Bazil, the engineer in charge, saw the arrival of a double load of untreated pilings and the pile driving hoist and associated equipment. Within twelve hours after their arrival Bazil had the equipment operational. The first load of pilings began to arrive from Superior on 14 April. The first test piles were sunk on 16-17 April and two days later work began on the bearing pilings for the approach and the bents were placed in the water. This work was completed on 22 April. The project was well coordinated because at Superior, crews were working 24 hours a day to get the pilings out and shipped to Marquette. At the latter site there was little space for a build-up of pilings. Between 22 April and 23 July the bearing piles for the dock proper were sunk. By 27 April two additional pile drivers had arrived so that one was used to drive batter piles and the other was used to assist with driving sheet piling. The additional equipment was needed because at the time, an average of 200 pilings were arriving each day and the drivers could barely keep up with them.

As construction started office space had to be located for the project. On 9 April, Bazil began the renovation of a building of the James Pickands Company at the nearby, unused coal dock for Merritt-Chapman & Whitney's officials and office staff. S.P. Berg, the engineer from the DSS&A refitted the old commissary on Lake Street as office space for the inspectors, material clerks, timekeepers and other clerical workers.

Meanwhile a small fleet of work boats began to arrive at the site. On 15 April the tug, William A. Whitney arrived from Superior with a scow in tow to be used to transport material from the shore as the dock extended into the water. Then towards the end of the month, Merrill-Chapman & Whitney sent the scow, Four

Spot from Duluth carrying concrete forms and completely equipped with a mixing machine and other apparatus for mixing and pouring concrete.

At the dock site work was progressing on schedule. By early May a third of the pilings were in place though progress had been slowed by a break down of a pile driver. On 4 May the laborers began to erect waling timber for the cribs and along the bearing piles. Crews started to drive sheet piling for cribs on 6 May. This type of piling was made by bolting three 4 x 12 timbers together with the center timber recessed several inches so as to form a groove into which a tongue, formed by a similar arrangement of timber, was slipped. Crib A was completed 18 May. One driver was used until the bearing pilings were completed and then two drivers were put to use. This work was completed on 23 July. Work on the batter piles commenced on 14 May and was completed by 4 June. Construction of movable forms for the substructure continued between 18 May and 29 July. On 26 May men began framing the approach bents both in the water and on land and completed this work on 1 December.

On the afternoon of 7 July the first of six concrete columns were poured at the site. Within two days half of the column foundations had been finished with the schedule calling for the rest of them to be completed within the next few weeks. On 22 July approximately one-third of the concrete had been poured. All of the mixers and associated equipment was in excellent working order and work progressed rapidly. The first of the concrete cross beams, each weighing ten tons, which connect the dock's columns laterally, was swung into place on 20 July. There were 24 concrete columns in place and foundation piers for approximately 15 more had been poured.

The "water work", as the pile driving was called, was to be completed within a week. The last of the sheet piling was being driven near the end of the dock and this, along with cluster piling at several points along the dock, would complete the work. A shipment of structured steel had arrived but its placement would have to wait. On land the wooden trestle neared Lake Street and this would be completed within a short time. Then construction would have to stop until the railroad tracks and the old approach could be dismantled.

Once the pilings were in place, work began on 8 June positioning the reinforced steel substructure dock. This work was completed 3 August. Once this was started work could begin on the major concrete portion of the structure. The concrete equipment consisted of the scow, mixer and a seventy foot concrete tower or traveler which would allow the concrete to be hoisted in a skip to the top of the dock. The traveler was erected on 30 June and

dismantled on 28 November. In order to construct and repair the precast tie beams, the old Spear dock was renovated. The first concrete work was begun on 21 May and consisted of beams being fabricated on shore and placed in the water as the first step in the foundation. This work at the dock continued until 28 July. Meantime, J.G. Olson, engineer in charge of construction, noted that 65% of the round pilings had been driven and the remainder of them would arrive within ten days. When an air hose operating a saw which trimmed the tops of the pilings went out of operation, work was temporarily halted. The crews driving the sheet piling were also slowed as they hit hard pan in the harbor bottom. As a result concrete work was held up until the problem was solved.

The concrete work on the basic structure continued without incident. The concrete mattress was placed over the substructure dock between 14 June and 30 July while work on the concrete pedestals and fender continued from 19 June through 4 August. Between 20 July and 19 October the tie beams were set into place on the dock. By mid-August, 56 piers of concrete columns which formed the underside of the dock had been poured and about half that number needed to be done before the foundation of the dock would be completed. The column piers were placed in the last few days and water line concrete work was completed. By 20 August, all but nine sets of concrete columns had been completed and total completion was planned within the week. While this work was underway the superstructure form work which began on 23 July continued until completion on 11 November.

At the east end of the dock is a large timber trestle structure. It is constructured of treated and squared timbers. It is thirty feet in length and runs the width of the dock. Attached to the concrete dock this addition provides a stairway from the base of the dock to the top. Midway up the structure there is a landing which provides access to the walkway at the chute level.

Work progressed on the pockets, chutes, and associated work. During the last few months of 1931 some of the finishing work on the dock was completed. The outer end fender piles and approach fender piles were completed between 23 October and 3 November. The steel deck was painted (6 November 1931-20 April 1932); the rails laid on the dock (19 November 1931-1 February 1932); and the deck plan was placed on the dock proper (4 December 1931-26 February 1932).

The heart of the Ore Dock consists of 75 pockets on both sides of the structure. Each of the 150 pockets has a storage capacity of seven 50 ton cars of ore. The chutes and related parts are treated in HAER No. MI-45-D.

The length of the facility which includes the approach and the dock is 3,546 feet. The dock itself measures 969 feet from the beginning of concrete construction to the fender at the east end. The width of the top of the dock measures 59 feet from side to side. The overhanging deck which supports the hoists and motors measures 67 feet 9 1/2 inches between the handrails.

Extending along the exterior face of the pockets on both sides of the dock is a plank walk which is placed above the apron between the pocket doors and the hinge ends of the chutes. This walk provides access to the pocket openings. Four stairways anchored to the concrete face of the dock provide access to the walk. The stairways terminate at a landing approximately 12 feet above the walk, which is reached by a steel ladder from this point. Steel railings provided adequate protection for workers using the stairs, landings, and walks.

The top of the dock is covered with a steel deck and four railroad tracks, with two tracks over each pocket. The ore train made its way to the top of the dock. Eighteen inch steel beams running the length of the dock support the rails. Four inch fir planking covers the deck except for the overhanging section.

Originally night illumination on the top of the dock was provided by 75 100-watt lamps suspended in strings of five lamps across the dock between 30 foot high steel poles located 60 feet apart. Each of the lamps was equipped with a bowl reflector. The individual pockets were lighted on the interior by a 100-watt lamp located under the deck towards the front wall of the pockets. On the exterior side a 100-watt lamp on a goose neck bracket was located above the door openings. Throughout the structure there was adequate lighting on the fenders, stairways, walks, etc.

The fender which ran the entire length of the dock was 6 feet in height above water and 5 feet in width from the outside face to the base of the columns. Two 14 x 14 inch oak wales, which extended 2 inches beyond the outside face of concrete prevented vessels from making contact with the concrete fender. The circular outer end of the fender of the dock had two clusters of fifteen oak piles with exterior waling strips which provided additional protection to boats.

Ships entered Marquette harbor from Lake Superior within channels dredged by the U.S. Army Corps of Engineers. Semaphores for day use (after 1944) and lights for night use signaled the captain whether to use the north or south slip.

The mooring posts on the fender are anchored to the concrete and are placed at intervals of 36 and 48 feet. A 2 1/2 inch pipe

hand rail, four feet above and on the inside of the fender extended the entire length of the dock on both sides providing protection for the seamen handling the lines and others passing to and from the vessels. Once docked the ship was loaded. The chutes, aligned with the holds of the ship, were lowered and the doors opened and the ore slid into the waiting ship. As a result of this process several ships could be loaded simultaneously or if there were no ships at the dock the trains continued to fill the pockets for the next arrival.

In 1932 the water approach to the dock had been dredged to a minimum depth of 24 feet below a mean low water elevation of 601.60 feet. The slips had a width of 80 feet extending from the shore some 650 feet. Beyond this point, a wider channel had been dredged, so that at a distance of 850 feet from the bulkhead it had a width of 125 feet.

On the south side of the dock is Ripley's Rock which acted as a obstacle to approaching vessels. A cluster of 30 oak piles, 12 feet above water level was placed on the 125 foot line and 170 feet southeast of a line drawn at right angles to the outer end of the dock.

Major improvements were made at the end of the 1947 season. The wooden fenders on the dock were rebuilt and pile drivers redrove the cluster piles. By mid-October the pilings for the protective fenders at the outer end of the ore dock had been redriven, but they had not been spaced nor the timber blocks installed. The cluster piles to the south near Ripley's Rock had been redriven and tied with cable. On the south side of the dock all of the pilings in the wood fender had been redriven but not cut off. The schedule called for work to be completed by the end of the month.

As the years passed, due to the harsh weather conditions repairs and improvements were constantly being made on the dock. Early in 1953 it was observed that the overhead wiring on the upper deck had to be replaced. This work was completed by 1957. Poor lighting at the end of the dock caused a flood light and two lights twelve feet above the fender to be installed in 1961. The electric hoist motors went through gradual maintenance and repair at the rate of two motors per year between 1956 and the early 1960s. During the early 1960s there were a number of seasons of heavy repairs made on the dock. During the winters of 1965-1966 and 1966-1967, general dock work was carried out along with the construction of approach posts, bridge piling and crib construction. At this time the wooden decking and walkways were repaired. Finally the untreated dock timbers were replaced with rot resistant treated timbers.

Due to lack of use, the approach, the wooden deck and stairs of the dock deteriorated. This is best evidenced in a 1981 inspection produced by the railroad. The Soo Line maintained fences and warning signs but both youths and adults, fascinated by the structure, trespassed. Then in the autumn of 1988 police discovered the skeleton of a local teenager who had fallen to his death on the structure.

Due to lack of use and maintenance, by 1990 the dock had fallen into a state of disrepair. Wisconsin Central Ltd. was concerned that anyone walking on the dock ran the risk of being injured because even the large timbers were weakened. The trestle at the east end of the dock has much of the stairway missing and cannot be used. There was also concern that the steel parts of the dock and the bolts had been weakened by the ravages of time and neglect.

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